UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

6/2/04

MEMORANDUM

Subject: **2,4-D.** Phase 2 Revisions to the Product and Residue Chemistry Chapters of the Reregistration Eligibility Decision; Reregistration Case No. 0073. Chemical I.D. No. 030001; DP Barcode No. D302263.

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Attached are the Phase 2 Product and Residue Chemistry Chapters of the 2,4-D Reregistration Eligibility Decision revised to reflect error comments provided by the Industry Task Force for 2,4-D Data and a separate set of comments provided by PBI/Gordon to address 2,4-D-DEA. An Executive Summary of the Chapters highlighting the conclusions and data gaps is presented below.

Executive Summary of the 2,4-D Product and Residue Chemistry Chapters

Product Chemistry. The outstanding product chemistry data requirements for the 2,4-D acid, salt, and ester products are summarized in Table 3 of the attached Product Chemistry Chapter of the 2,4-D RED, and are detailed in the attached data summary table. Provided that the registrants submit the data required in the attached data summary tables for their T/TGAI and FI products,

and either certify that the suppliers of beginning materials and the manufacturing processes for the 2,4-D manufacturing-use products have not changed since the last comprehensive product chemistry reviews or submit complete updated product chemistry data packages, HED has no objections to the reregistration of 2,4-D and its salts and esters with respect to product chemistry data requirements.

Residue Chemistry. 2,4-Dichlorophenoxyacetic acid (2,4-D) is an alkylchlorophenoxy herbicide used to control a variety of broadleaf weeds. 2,4-D may also occasionally be used as a plant growth regulator or fungicide. There are nine active ingredients (AIs) in 2,4-D Reregistration Case 0073 that are components of a registered pesticide product labeled for use on a food or feed crop; these same nine AIs are also being supported for reregistration by the Industry Task Force II on 2,4-D Research Data (hereafter referred to as Task Force II). These AIs are: the acid form of 2,4-D, the sodium salt, four amine salts, and three esters. The members of Task Force II currently include Agro-Gor Corp (jointly owned by Atanor, S.A. and PBI-Gordon Corp.), Dow AgroSciences, and Nufarm USA. In addition, USDA's Interregional Project No. 4 (IR-4) is supporting the reregistration of a number of minor crop uses for 2,4-D and the California Citrus Quality Council (CCQC) is supporting selected uses of 2,4-D isopropyl ester (IPE) on citrus fruits.

2,4-D is currently registered by Task Force II members for food/feed uses on a variety of field and orchard crops and aquatic sites. The 2,4-D formulation classes registered for food/feed uses include wettable powders (WP), granules (G), soluble concentrates in both liquid (SC/L) and solid (SC/S) forms, and emulsifiable concentrates (EC). These formulations are typically applied as broadcast, banded, or directed (spray or wiper) applications during dormancy or preplant, preharvest, preemergence, emergence, postemergence, or postharvest using ground or aerial equipment. Tolerances are currently established for residues of 2,4-D per se in/on: numerous raw agricultural commodity (RAC) human foods derived from fruits, grasses, grains, nuts, vegetables, sugarcane, cotton, hops, and asparagus at 0.1 ppm to 5 ppm; processed products of sugarcane (5 ppm) and grains (2 ppm); fish and shellfish at 1.0 ppm and potable water at 0.1 ppm [40 CFR §180.142(a)(1-6 and 9-13)]. A time-limited tolerance of 0.02 ppm for 2,4-D per se in/on soybean seed, expiration 12/31/04, has since been extended [40 CFR §180.142(a)(11); FR Notice Vol. 67, No. 46, March 8, 2002]. A time-limited tolerance of 0.1 ppm in/on wild rice established under FIFRA Section 18 will expire 12/31/05 (FR Notice Vol. 68, No. 11, Jan. 16, 2003). Tolerances for residues in livestock commodities are currently established in terms of residues of 2,4-D and/or its metabolite 2,4-dichlorophenol [40 CFR §180.142(a)(8)]. The MARC has determined that 2,4-D *per se* is the residue of concern in plant and livestock commodities as well as drinking water and that tolerances listed at 40 CFR §180.142 are to be defined as "residues of 2,4-D, both free and conjugated, determined as the acid" (W. Hazel/L. Taylor, D293119, TXR No. 0052264, 12/3/03).

There are numerous 2,4-D EPs registered under FIFRA Section 3 to the members of Task Force II. To indicate what uses are being supported by Task Force II members, they have provided the Agency with a Master Label which SRRD determined would serve as the universe of supported

uses for reregistration purposes. For each use site, the Master Label generally summarizes the following information: forms of 2,4-D being supported (i.e. acid, amine salts, and/or esters); types of formulations being supported (i.e. EC, WP, etc.); limitations on the type and timing of application(s); allowed application equipment; reentry interval (REI); maximum single and seasonal application rates; minimum retreatment interval (RTI); regional restrictions; and restrictions on the preharvest and grazing intervals (PHI and PGI). The Master Label does not provide details for uses on labels of specific EPs. A very brief summary of several representative label directions for use on major crops include: (i) small grains, 1.25 + 0.5 lb ae/A postemergence + preharvest, 14-d PHI, $\leq$1.75 lb ae/A/season; (ii) field corn, 1 + 0.5 + 1.5 lb ae/A pre- + postemergence + preharvest, 7-d PHI, $\leq$3 lb ae/A/season; (iii) pasture and range, 2 lb ae/A postemergence, 7-d precutting interval; (iv) grapes, 1.36 lb ae/A, postbloom, 100-d PHI; orchard fruits and nuts, 2 x 2 lb ae/A postemergence/yr, 14-d PHI for pome fruits, 40-d for stone fruits, and 60-d PHI for nuts; and (v) citrus plant growth regulator use, 12-200 ppm foliar application with 7-day PHI, 500 ppm postharvest application with no PHI.

For the purposes of reregistration, the following amendments are recommended to be made to all labels having the designated uses of 2,4-D:

(i) directions for preharvest uses on citrus in the U.S. should be restricted to AZ and CA and should list a maximum use rate of 0.27 lb ae/A/crop cycle;

(ii) a 7-day PHI should be specified for corn forage (all types);

(iii) for uses on stone fruits, tree nuts, and pistachios, the maximum single use rate should be reduced to 1.4 lb ae/A, and the maximum seasonal use rate should be reduced to 2.8 lb ae/A;

(iv) all labels bearing aquatic uses should be amended to indicate that: (a) all treated bodies of water to be used or likely to be used as a drinking water source must be demonstrated to contain 2,4-D at <70 ppb using an approved assay before diversion for drinking water may occur;(b) the aquatic uses of 2,4-D should be restricted to Federal, State, or local agencies or applicators under their control; and (c) when treating moving bodies of water, applications must be made while traveling upstream to prevent concentration of 2,4-D downstream from the application. The 1500-foot setback proposed on the Master Label may optionally be specified on labels bearing an aquatic use as an additional means of mitigating 2,4-D exposure via drinking water although this restriction alone does not reliably reduce dietary risk to an acceptable level. An interested party may choose to propose and support a longer drinking water intake setback distance if demonstrated to be practical, enforceable, and reduce exposure significantly.

(v) all labels bearing pasture and range (grass forage/hay) uses should prescribe a 3-day pregrazing interval for dairy animals as milk residues 3 days after the last day of dosing in a feeding study were used for milk tolerance reassessment and the dietary exposure assessment. A similar PGI is not considered to be practical or enforceable for meat animals. The 3-day preslaughter interval (PSI) on all labels bearing pasture and range uses should be deleted because this is not considered to be practical or enforceable.

In addition, HED notes that, according to the Master Label, the Task Force II is not supporting the use of 2,4-D esters on pistachios, filberts, and other tree nut crops. However, adequate residue data are available supporting the use of ester forms of 2,4-D on these crops. Therefore,

labels for the ester forms of 2,4-D may include use directions for pistachios, tree nuts, and filberts (sucker control) if a party is interested in labeling for such uses.

Also, a 40-day PHI is presently being specified for stone fruits. However, the available residue data indicate that residues are <LOQ (<0.05 ppm) at a 14-day posttreatment interval. Therefore, strictly from a residue chemistry perspective, the PHI for stone fruits could be reduced to 14 days without affecting the tolerance level.

The supported use on grapes is restricted to CA only; however, adequate field trial data reflecting use of 2,4-D amine salts are available for the entire U.S. Therefore, labels for the acid and amine salt forms of 2,4-D, strictly from a residue chemistry perspective, do not need to restrict the use on grapes to only CA.

The reregistration requirements for plant and livestock metabolism are fulfilled. Adequate metabolism studies are available depicting the qualitative nature of the residues in three dissimilar crops (lemon, potato, and wheat), the goat, and the hen. Based on the available data, on 9/3/03, the MARC determined that the residue of concern in plants and livestock for both tolerance expression and risk assessment purposes is 2,4-D, free and conjugated, determined as the acid (W. Hazel and L. Taylor, 12/3/03, D293128, TXR No. 0052264).

Adequate methods are available for data collection and the enforcement of plant commodity tolerances. Task Force II submitted an adequate proposed GC/ECD enforcement method for plants (designated as EN-CAS Method No. ENC-2/93, described below) which has been independently validated and radiovalidated. Two separate (but essentially comparable) proposed enforcement methods were submitted for determination of 2,4-D in livestock commodities. These have been adequately radiovalidated. The Agency concluded that the methods are adequate provided the registrants satisfactorily address two minor issues. The 10/97 edition of FDA PAM Volume I, Appendix I indicates that 2,4-D is partially recovered (50-80%) using Multiresidue Methods Section 402 E1 and 402 E2.

The reregistration requirements for magnitude of the residue in plants have been evaluated and deemed fulfilled for the following raw agricultural commodities (RACs): almonds and almond hulls; apples; asparagus; aspirated grain fractions (corn and wheat grain); blueberries; cherries; corn (field) grain, forage, and stover; corn (sweet) K+CWHR; cranberries; filberts; grapes; grapefruit (preharvest); grass forage and hay; hops, lemons (pre- and postharvest); oranges (pre- and postharvest); peaches; pears; pecans; pistachios, plums/fresh prunes; potatoes; rice grain and straw; wild rice grain; sorghum grain, forage, and stover; soybean forage, hay, and seeds; strawberries; sugarcane; and wheat grain, forage, and straw.

Overall, acceptable field trials were performed representing the maximum registered use patterns and conditions under which the pesticide could be applied. The geographic representation for each commodity is generally adequate, and a sufficient number of trials reflecting representative

formulation classes were conducted. Additional field trials are required only for wheat hay, which will be translated to several other small grain crops.

The reregistration requirements for magnitude of the residue in the processed commodities of the following crops have been fulfilled: apples, barley, citrus fruits, corn, oats, plum/prunes, potatoes, rice, rye, sorghum, soybeans, sugarcane, and wheat. Residues of 2,4-D did not concentrate in any regulated processed commodities derived from apple, corn grain, plum/prunes, and sorghum grain. However, concentration of residues was observed in regulated commodities processed from citrus fruits, sugarcane, and wheat grain.

The reassessed tolerances for residues of 2,4-D in/on livestock feed items range from 0.02 ppm in/on soybean seeds to 360 ppm in/on grass forage. The maximum theoretical dietary burdens (MTDB) for beef and dairy cattle has been calculated to be 874 ppm, the majority of which is derived from the tolerance level for grass forage. Based on feeding studies, the 2,4-D tolerance in milk may be reduced from 0.1 ppm to 0.05 ppm whereas the 2.0-ppm tolerance in kidney has been reassessed at 4.0 ppm and the 0.2-ppm tolerances in meat, fat, and meat byproducts except kidney (of cattle, goats, horses, and sheep) have been reassessed at 0.3 ppm. The MTDB for poultry and swine is 1.6 ppm, based primarily on the 2.0 ppm tolerance on wheat grain. The reregistration requirements for studies pertaining to magnitude of the residue in swine tissues and poultry tissues and eggs have been waived as there is no reasonable expectation of finite residues in swine tissues, poultry tissues, and eggs [Category 3 of 40 CFR §180.6(a)(3)] when 2,4-D is applied according to registered use directions. Therefore, tolerances for residues of 2,4-D in poultry and swine commodities are not necessary. Also, they will be excluded from the dietary exposure assessment.

An adequate fish metabolism study is available that fulfills reregistration requirements. In the fish metabolism study, the major ^{14}C-residue in edible tissues of bluegill sunfish was 2,4-D (80% TRR) along with minor amounts of 2,4-DCP (7.9% TRR). Based on these data, the residue to be regulated in fish and shellfish is the same as that in livestock, i.e., 2,4-D, free and conjugated, determined as the acid (W. Hazel and L. Taylor, 12/3/03, D293128, TXR No. 0052264).

Adequate studies are available depicting the magnitude of 2,4-D residues in catfish, bluegill sunfish, crayfish, and clams exposed to water containing 6.0 ppm (1.5x) of 2,4-D in a static system. Based on these studies, tolerances for 2,4-D residues have been reassessed at 0.1 ppm in fish and 1.0 ppm in shellfish.

Note that EPA's Office of Water (OW) has established a Maximum Contaminant Level (MCL) of 0.07 ppm for 2,4-D in drinking water. The aquatic use patterns currently being supported by Task Force II also prohibit the use of 2,4-D treated water for use as potable water unless an approved assay indicates that 2,4-D concentrations are $\leq$0.07 ppm. The 0.1-ppm tolerance in potable water [40 CFR 180.142(a)(13)] should be revoked as levels of contaminants in drinking water are now under the regulatory purview of OW as opposed to OPP.

The aquatic use patterns currently being supported by Task Force II prohibit the use of 2,4-D treated water for irrigation unless an approved assay indicates that 2,4-D concentrations are ≤ 0.1 ppm. Irrigated crop data are sufficient to establish tolerances in all crops except sugar beet and perennial crops (to be represented by strawberry). A number of direct-treated crop tolerances are high enough to accomodate any additional 2,4-D residues that may be incurred by irrigation with treated water.

The reregistration requirements for confined/field rotational crop studies are fulfilled. The available confined rotational crop data indicate that additional field trials are not required. In addition, no rotational crop tolerances are necessary, and no plantback intervals following 2,4-D application are needed. The majority of the ^{14}C-residues in confined crop studies were characterized as either aqueous soluble or unextractable and reflected the incorporation of radioactivity into natural components. The only residues detected in any matrix were 2,4-D and 2,4-dichloroanisole, both at very low levels.

The following confirmatory data are recommended: wheat hay field trials and limited irrigated crop studies (sugar beet roots and tops and strawberry) are recommended to support tolerance establishment/reassessment associated with the use patterns currently supported by Task Force II.

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